

Bryla, D.R., Bouma, T. and Eissenstat, D.M. Root respiration in citrus acclimates to temperature slows during drought. *Plant Cell & Environment* 20: 1411-1420.

Abstract

Citrus seedlings were grown in soil columns in which the root system was hydraulically separated into two equal layers, which enabled us to maintain roots in the upper layer without water for 110 days. The columns were placed into waterbaths modified so that soil temperatures in the top layer could be maintained either at 25 °C or at 35 °C, while temperature in the bottom layer was maintained at 25 °C. We hypothesized that if citrus plants were grown in dry soil for an extended period of time, root mortality would increase if the cost of maintaining the roots was increased by elevating the soil temperature. However, during the drought period we did not observe any root mortality, even at the higher soil temperature. Moreover, we did not find that root respiration was increased by prolonged exposure to drought and higher soil temperature. We did find that root respiration rates slowed in dry soil. Furthermore, when the soil columns were switched from one temperature treatment to another, root respiration rates in wet soil rapidly increased when moved to a higher temperature or rapidly decreased when moved to a lower temperature. But after only 4 days, respiration rates returned to their original level; root respiration in dry soil was not affected by either short- or long-term shifts in soil temperature. Thus, root respiration in citrus appears to rapidly acclimate to changes in soil temperature.